

REMARKS

The Applicant thanks the Examiner for the thorough consideration given the present application. Claims 1-15 are pending. Claims 10-13 are withdrawn. Claims 1-5, 7-10, and 13 are amended, and claims 14 and 15 are added. Claim 1 is independent. The Examiner is respectfully requested to reconsider the rejections in view of the amendments and remarks set forth herein.

Foreign Priority

It is gratefully appreciated that the Examiner has acknowledged the Applicant's claim for foreign priority.

The Drawings

It is gratefully appreciated that the Examiner has accepted the drawings.

Information Disclosure Statement

It is gratefully appreciated that the Examiner has acknowledged the Information Disclosure Statement (IDS) filed on February 11, 2004.

Election Requirement

The Examiner has made the Restriction Requirement final and has withdrawn claims 10-13 from consideration. Assuming claims 1-9 are found to be allowable, it is respectfully requested that the Examiner also consider and allow withdrawn claims 10-13.

If the Examiner persists in this Restriction Requirement, the Applicant reserves the right to file one or more divisional applications at a later date if so desired.

Specification Objection

In response to the objection, the Applicant has amended the paragraph beginning on page 2, line 12 of the specification. Reconsideration and withdrawal of the objection are respectfully requested.

Claim Objections

In response to the objection to the claims, the Applicant has amended claims 3, 8, and 9, thus addressing each of the issues pointed out by the Examiner. Reconsideration and withdrawal of the objection are respectfully requested.

Rejections Under 35 U.S.C. §103(a)

Claims 1, 2, 6, 7, 11, and 12 stand rejected under 35 U.S.C. §102(e) as being unpatentable over Isogai et al. (U.S. 6,188,093) in view of Miida (U.S. 6,476,371). This rejection is respectfully traversed.

Arguments Regarding Independent Claim 1

The Applicant respectfully submits that, except for the amendment to independent claim 1 to correct an informality, independent claim 1 as currently set forth a combination of elements not taught or suggested by the prior art cited by the Examiner, including *inter alia*

the charge transfer region forming a first potential barrier to the charges in the charge generating region, the first potential barrier being removable according to the applied voltage to the photo-detector.

Support for the novel combination of elements set forth in independent claim 1 can be seen, for example, in FIG. 2.

First of all, on page 4 of the Office Action, the Examiner asserts that the region below transfer gate 3 and the N type region 13 (as disclosed in Isogai et al. FIG 3), teach the charge transfer region and the charge accumulation region, respectively, of the present invention. The Examiner also asserts the carrier pocket 25 (as disclosed in Miida FIG. 2) teaches the accumulation region of the present invention.

However, as disclosed in Isogai et al. FIG. 3, the region below transfer gate 3 is merely an insulating film 33. In addition, N type region 13 of Isogai et al. is mounted directly on P-type charge accumulation region 12.

Thus, the structure of the Isogai et al. device is completely different from that of the present invention and the disclosure in Miida fails to make up for the deficiencies of Isogai et al.

In addition, on page 5 of the Office Action, the Examiner asserts that “the claims to the charge transfer region forming a first potential barrier to the charges in the charge generating region, the first potential barrier being removable according to the applied voltage to the photo-detector are purely functional limitations. It is well know in that similar

structures have similar characteristics and functions. Thus, as the device of Isogai et al. and Miiida meets the structural and methodological limitations of this claim, it should also be able to exhibit similar functional capabilities."

The Applicant respectfully disagrees with the Examiner's position regarding functional claim language recited in apparatus claims, and submit the language must be given patentable weight. Furthermore, functional definitions are not only common but have been expressly approved in many cases including *Locklin et al. v. Switzer Bros., Inc.*, 299 F.2d 160, 131 USPQ 294 (C.A. 9th); *Sales Affiliates, Inc. v. Hutzler Bros. Co.*, 71 F.Supp. 287, 72 USPQ 211 (D.C. Md), at 216, aff'd., 164 F.2d 260, 75 USPQ 259; *Ex parte Sperr*, 12 USPQ 194 (PO Bd.); *Ex parte Carter*, 52 USPQ 186 (PO Bd.); *Ex parte Kellog*, 84 USPQ 380 (PO Bd.); and *Ex parte Ebel and Drew*, 84 USPQ 202 (PO Bd.). Also, analogous "functional" limitations with respect to uncritical time or temperature have been approved in claims in: *Ex parte Ebel and Drew, supra*; *Ex parte Fowler and Otis*, 46 USPQ 425 (PO Bd.); *Procter & Gamble Mfg. Co. v. Refining, Inc.*, 135 F.2d 900, 57 USPQ 505 (C.A. 4th); and *Ex parte Clarke*, 98 USPQ 195 (PO Bd.).

It is well established that functional elements should be considered in claim analysis. In *Clements Industries Inc. v. A. Meyers & Sons Corp.*, 12 USPQ2d 1874 (SD NY 1989), the Court stated "We are aware that functional language such as that here at issue ... is allowed in claims and is entitled to full weight in claim analysis" citing to *In re Swinehart and Sfiligoj*, 169 USPQ 226 (CCPA 1971).

Accordingly, the Applicant respectfully requests that the Examiner to give all of the claim features patentable weight and due consideration in accordance with the above-cited case law.

In view of the above structural differences set forth in independent claim 1, and the patentable weight that should be given to the functional limitations of independent claim 1, the Applicant respectfully submits that the Examiner has failed to establish a prima facie case of obviousness.

At least for the reasons described above, the Applicant respectfully submits that the novel combination of features set forth in dependent claim 1 is not disclosed or made obvious by the prior art of record, including Isogai et al. and Miida.

Dependent Claims

The Examiner will note that dependent claims 2-5 and 7-10, and 13 have been amended, and that dependent claims 14 and 15 have been added to set forth additional novel features of the present invention.

For example, added dependent claim 14 recites a novel combination of features, including *inter alia*

a second charge eliminating region formed near the charge generating region,

wherein the second charge eliminating region is a p + type impurity region formed on an upper surface of an n + type impurity region in the photo diode.

Support for the novel combination of elements set forth in claim 14 can be seen, for example, in FIG. 2.

The Applicant respectfully submits that the combination of features set forth in dependent claim 14 is not disclosed or made obvious by the prior art of record, including Isogai et al. and Miida.

On page 6 of the Office Action, the Examiner asserts that region 6a, as shown in Isogai et al. FIG. 4 teaches the second charge eliminating region of the present invention. However, as can be seen in FIG. 4, element 6a is merely formed under N-type drain layer 16. Thus, Isogai et al. fail to suggest “second charge eliminating region is a p + type impurity region formed on an upper surface of an n + type impurity region in the photo diode” as set forth in dependent claim 14.

In addition, for example, added dependent claim 15 sets forth a novel combination of features including *inter alia*

the region is a small gap bounded on one lateral side by the charge generating region, and bounded on an opposite side by an n + type impurity region.

On page 6 of the Office Action, the Examiner asserts that drain region 16 suggests the “region” of the present invention. As can be seen in FIG. 4, drain region 16 of Isogai et al. is a completely different structure, and fails to suggest “the region is a small gap bounded on one lateral side by the charge generating region and bounded on an opposite side by the n + type impurity region”, as presently claimed.

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All dependent claims are in condition for allowance due to their dependency from allowable independent claims, or due to the additional novel features set forth therein.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a) are respectfully requested.

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CONCLUSION

Since the remaining patents cited by the Examiner have not been utilized to reject claims, but merely to show the state of the art, no comment need be made with respect thereto.

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. It is believed that a full and complete response has been made to the outstanding Office Action, and that the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, he is invited to telephone Carl T. Thomsen (Reg. No. 50,786) at (703) 205-8000.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of one (1) month to April 29, 2006 in which to file a reply to the Office Action. The required fee of \$120.00 is enclosed herewith.


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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly extension of time fees.

Dated: April 17, 2006

Respectfully submitted,

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